SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: BIOMETRICS

Code No.: FOR 308-3

Program: FISH AND WILDLIFE TECHNOLOGY

Semester: VI

Date: FEBRUARY, 1985

Author: V. WALKER

New: X Revision: _____

APPROVED: _____ Feb 8/85
Chairperson Date

CALENDAR DESCRIPTION

BIOMETRICS	FOR 308-3
COURSE NAME	COURSE NUMBER

PHILOSOPHY/GOALS: To provide the student with a working knowledge of analysis of variance, regression and correlation and chi-square in research and management of natural resources. An introduction to the Minitab data analysis system will be initiated.

METHOD OF ASSESSMENT (GRADING METHOD):

Term Test	70%
Homework Assignments	30%
	100%

TEXTBOOK(S):

Schefler, William C., Statistics for the Biological Sciences, 1979. Addison-Wesley Publishing Company, Don Mills, Ontario.

COURSE OUTLINE

TEXTS: Statistics for the Biological Sciences - W.C. Schefler
Student Minitab Reference Manual.

UNIT #1

- Chi-square goodness of fit
- F-test
- Single classification of ANOVA
    - calculation of sources of variation
    - construction of ANOVA table
    - calculation of F-ratio
    - interpretation of results for Model I and Model II
    - comparison with student's t-distribution
    - a priori and posteriori test

TERM TEST #1

UNIT #2

- Two-way ANOVA
    - calculation
    - construction of ANOVA table
    - interpretation of results
    - significance testing
    - replication, assumptions of ANOVA

- Non-parametric tests
    - Sign test
    - Wilcoxon test
    - rank correlation
    - Kruskal-Wallos test
    - Friedman test

TERM TEST #2

UNIT #3

- Regression and correlation
    - straight line regression and calculation
    - tests of significance
    - calculation of correlation coefficient
    - confidence limits

TERM TEST #3

TERM TESTS

Term tests will be written at the end of Units 1, 2 and 3 for a total value of 70% of the course grade. Term tests are accumulative.

HOMEWORK ASSIGNMENTS

Problems in the form of homework assignments will constitute the remaining 30% of the course grade. Certain of these problems will be solved using the Minitab data analysis system. Late assignments will be deducted 10% per day for every day late.

Students failing to submit homework assignments will receive an "I" for that assignment. Students with outstanding homework assignments at the end of the semester will be required to submit those assignments, although they will be valued at zero. Failure to submit outstanding assignments will result in an "I" grade for the course regardless of term test results.

Students failing two or more term tests will be required to write a final exam on the entire course content during the rewrite period. A passing grade is 60%.

Students receiving a grade of less than 60% based on term tests and homework assignments will be required to rewrite the unit test on which they performed the poorest during the rewrite period.

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: BIOMETRICS

Code No.: FOR 301-4

Program: FISH & WILDLIFE TECHNOLOGY

Semester: FIVE

Date: AUGUST, 1984

Author: S.C. VERMA

New: _____ Revision: X

APPROVED: _____ _____

Chairperson Date

BIOMETRICS	FOR 301-4
Course Name	Course Number

PHILOSOPHY/GOALS:

The course will review basic descriptive statistics, their uses and limitations followed by problem solving using the binomial, Poisson, normal and t-distributions. The use of confidence limits in hypothesis testing is considered, followed by an introduction to analysis of variance. Emphasis is placed on solving typical problems in the specialized area using statistical package and library programs. An effort is made to consider practical fish and wildlife problems encountered by resource managers.

METHOD OF ASSESSMENT (GRADING METHOD):

	MARKS
MIDTERM TESTS (2)	40
FINAL TEST	40
ASSIGNMENTS	20
TOTAL	100

TEXTBOOK(S):

Schefler, William C., 1980. Statistics for the Biological Sciences, Addison-Wesley Publishing Co., Don Mills, Ontario.

STUDENT EVALUATION:

A total of three (3) term tests will be written after units 2, 4, and 7.

A series of homework questions will be assigned for a total value of 20%. A pass mark for the course is 60%.

The final mark will be awarded which is higher of either:

a) the final examination
b) weighted mark calculated on the basis of all the term tests and assignments.

EQUIPMENT:

An electronic calculator is mandatory for classroom and test purposes.

REFERENCE TEXTS:

lder, H.L. and E.B. Roessler, 1972. Introduction to Probability and tatistics, Freeman, San Francisco, 373 p.

Finney, D.J., 1966. Experimental Design and Its Statistical Basis, Univ. Chicago Press, Chicago, 169 p.

Giles, R.H. (Editor), 1971. Wildlife Management Techniques, The Wildlife Society, Washington, 633 p.

Levin, R.I. and D.S. Rubin, 1980. Applied Elementary Statistics, Prentice-Hall, Inc., Englewood Cliffs, N.J. 07632.

Ricker, W.E., 1968. Methods for Assessment of Fish Production in Fresh Water, IBP Handbook No. 3, Blackwell, Oxford 313 p.

Sanders, D.H., A.F. Murph and R.J. Eng, 1980. Statistics: A Fresh Approach, McGraw-Hill Book Company, Toronto.

Snedecor, G.W. and W.G. Cochran, 1967. Statistical Methods, 6th Edition, Iowa State University Press, Ames, 593 p.

Sokal, R.R. and F.J. Rohlf, 1969. Biometry, the Principles and Practice of Statistics in Biological Research, Freeman, San Francisco, 776 p.

BIOMETRICS - FOR 301-4

COURSE OUTLINE

		NO. OF WEEKS
UNIT 1:	Introduction - the misuse of statistics - experimental design - two-group designs	1
UNIT 2:	Aranging data - data array and frequency distribution - measure of central tendency: - the arithmatic mean - the weighted mean - the geometric mean - mode, median - measure of despersion: average deviation measures - relative dispersion: coefficient of variation	3
UNIT 3:	Probability - basic concepts - types and rules - independent, dependent events - the Binomial distribution	3
UNIT 4:	The Normal Distribution - normally distributed data - normal curve areas - departures	2
UNIT 5:	Sampling and Sampling Distribution - normally the meaning of inference - sampling, sample size - sampling distribution - standard error - estimation: interval estimates - t-distribution	3
UNIT 6:	Hypothesis Testing - basic concepts - decision making - one and two-tailed tests - levels of significance	3
UNIT 7:	Analysis of Variance - comparisons among more than 2 groups - assumptions - model 1 and model 2	1

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: NATURAL RESOURCE PLANNING

Code No.: FOR 300-3

Program: FISH AND WILDLIFE AND PARKS AND RECREATION TECHNOLOGY

Semester: V

Date: SEPTEMBER, 1985

Author: H. A. COOPER

New: _____ Revision: X

APPROVED: _____ _____

Chairperson Date

CALENDAR DESCRIPTION

RAL RESOURCE PLANNING	FOR 30[illegible]-3
Course Name	Course Number

PHY/GOALS:

project oriented course in which the student inventories, evaluates pares a recreational land-use plan for a natural area. Areas for ay be selected by the student to accommodate his/her area of st.

n oral presentation and written report are required for evaluation. le projects include day-use parks, interpretive trails, marsh ent, trout stream management, or upland game management plans.

OF ASSESSMENT (GRADING METHOD):

ekly progress reports and attendance	- 15%
d-term progress interview	- 10
ort report on species or area	- 15
al presentation of plan	- 25
itten version of plan	- 25
omotional brochure describing area	- 10
	100%

s: A = 80% +

B = 70 - 79%

C = 60 - 69%

I = less than 60%

K(S):

eference list of library materials assigned to students.

OBJECTIVES:

The student will select an approved natural area and on that area will be required to:

1. Perform a complete inventory of all pertinent flora, fauna, soil and geological features, natural history and climate, and existing land use.

2. Analyze the features found with respect to significance, and briefly compile them in legible field notes and plot them on maps.

3. Research data regarding the species and area managed to assess the suitability of the prescribed area for these species or activities.

4. Prepare a detailed development plan complete with maps and specifics of all proposals and alternatives, to be presented in proper technical manner.

5. Prepare a promotional brochure to describe the area and the proposed developments there to the public (ie. other students).

6. Present the final management plan to an audience in a professional manner, using appropriate aids.

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: CHEMISTRY

Code No.: CHM 300-3

Program: FORESTRY TECHNOLOGY (FISH & WILDLIFE)

Semester: FIVE

Date: NOVEMBER, 1985

Author: J. S. KORREY

New: _____ Revision: X

APPROVED: _____ Nov 22/85
Chairperson Date

CHEMISTRY	CHM 300-3
Course Name	Course Number

PHILOSOPHY/GOALS:

CHM 300-3 is a one semester course designed to provide fish and wildlife students with the basic theory and background for a better understanding of work done in other areas such as environmental measurements. Topics covered are: matter, physical and chemical change, density, structure of matter, mol concept, percent composition, chemical formulas, nomenclature, equations, solubility, concentration, and solution problems, acid-base theory and the chemistry of some biological compounds.

METHOD OF ASSESSMENT:

A = 80 - 100%
B = 70 - 79%
C = 60 - 69%
I = 59% or less

WEIGHTING: Theory = 45% - based on average mark obtained on four tests.

Lab = 35% - the lab grade will be based on the performing of fiv labs and assessment of the five reports submitted.

Project = 20% - research project

Credit standing in CHM 300 may be obtained in one of the following ways:

1. "A" Level: To obtain an "A" grade, completion of the research project is required.

2. "B" or "C" Level: Achievable by those students who may elect not to do project and still pass with a "B" or "C" grade.

Students having Grade 12 or 13 Chemistry may be exempted from attendance of t first three units of work by successfully writing a pre-test on these topics. This exemption applies only to the "theory" portion of the course. The laboratory part of the course is required by all students and 100% attendance in lab is a mandatory requirement.

Students having over 50% but less than 60% will be given the opportunity to obtain a passing grade ("C") by writing a make-up test on the whole semester' work, provided they have attended at least 85% of the lectures, and then only at the discretion of the instructor.

TEXTBOOK(S):

Malone, Leo J., Basic Concepts of Chemistry, John Wiley and Sons, N.Y.

REFERENCES:

Robinson, W. L. and Bolen, E. G., Wildlife Ecology and Management, MacMillan, 1984.

Arms, Karen and Camp, P. J., Biology, 2nd Edition, Holt, Rinehart and Winston 1982.

CHEMISTRY 300-3

	TIME(HRS)	
UNIT I:	3	Chemistry and Matter REF: Chapter 1 and 3 - Malone

- Chemistry and nature of matter
- Properties of matter
- Physical and chemical changes
- Density (Chapter 2)
- Structure of the elements
- Compounds and formulas
- Ions and ionic compounds
- Structure of the atom
- Atomic no., mass no., atomic mass

UNIT II:	4	Periodic Nature of the Elements REF: Chapters 4 and 5 - Malone

- Periodic table of the elements
- Physical properties of the elements
- Periods
- Groups
- Trends

UNIT III:	6	Chemical Formulas and Nomenclature of Inorganic Compounds REF: Chapter 7 - Malone

- Oxidation states
- Naming binary compounds
- Naming ternary compounds containing oxygen
- Naming common acids

Chemical Equations
REF: Chapter 9 - Malone

The student will be able to write and balance equations representing the 5 types of chemical reactions.

UNIT IV:	8	The Mole Concept REF: Chapters 8 and 9 - Malone

- Molecular mass of compounds
- The number of moles in a given mass of material
- Equivalent weight of acids, bases, salts, elements
- Percent composition

UNIT IV: (Cont'd) Solution Problems
REF: Chapter 11 - Malone

- Solubility of ionic compounds
- Methods of expressing concentration
- Solution Problems
  5 types - A) Preparation of a molar solution
  B) Working from specifications
  - $M = \frac{\% \text{ purity} \times \text{Sp. Gr.} \times 1000}{\text{GMW}}$
  C) Serial dilution problems and use of the formula $C_1V_1 = C_2V_2$
  D) Preparation of a normal solution and relationship between M & N

UNIT V: 7 Acid-Base Equilibria
REF: Chapter 15 - Malone

- Equilibria in water
- Concept of pH and pOH
- Weak acids and bases in water
- Buffers

UNIT VI: 8 Organic Chemistry & Biologically Significant Compounds

- A brief introduction to biologically related compounds
  - proteins (amino acids) †
  - carbohydrates † Relate these to energy
  - lipids - waxes † transfer & nutrition
    - steroids †
  - cellulose †
  - vitamins
  - minerals
  - enzymes

TOTAL 36 HOURS

LABORATORY EXPERIMENTS

A two-hour lab session will be run every other week. The labs are designed to give the student practice in basic lab techniques. Experiments to be conducted are:

(6 weeks x 2 hours) = 12 hours

1.	Physical Properties - densities of liquids & solids	2 hours
2.	Serial Dilution	2 hours
3.	pH Measurements using papers, indicators & meters	2 hours
4.	Titration for Total Inflection Point Alkalinity	2 hours
5.	Energy Determinations Using Bomb Calorimeter	4 hours

LAB ASSIGNMENTS ARE DUE ONE WEEK AFTER COMPLETION OF LAB WORK. LATE ASSIGNMENTS WILL NOT BE ACCEPTED.

OBJECTIVES FOR CHM 300 - CHEMISTRY FOR FORESTRY TECHNOLOGY

FISH AND WILDLIFE TECHNOLOGY PROGRAM

AUGUST, 1985

UNIT 1: CHEMISTRY, MATTER, CHANGES AND ENERGY

Ref: Chapters 1, 2 and 3. Malone, Leo J. Basic Concepts in Chemistry.

AFTER COMPLETION OF THESE CHAPTERS, THE STUDENT SHOULD BE ABLE TO:

1. Give the definitions of chemistry and matter.
2. Describe the three states of matter and give examples of each.
3. Classify a sample of matter as either heterogeneous or homogeneous.
4. Distinguish between a mixture, a solution and a pure substance.
5. Classify a list of pure substances as either elements or compounds.
6. State the names and symbols of the first 20 common elements.
7. Give examples of physical and chemical properties and physical and chemical changes.
8. Apply the law of conservation of mass to explain observed chemical changes.
9. Classify a physical or chemical change as either endothermic or exothermic.
10. Name and describe the various forms of energy.
11. Distinguish between potential and kinetic energy.
12. Distinguish between density, buoyancy and specific gravity.
13. Calculate density given appropriate experimental data and use it as a conversion factor between mass and volume.
14. Convert temperatures in degrees Celsius to Fahrenheit and Kelvin and vice versa.
15. Describe the nuclear atom, including the name, location, mass (in amu) and electrical charge of the three particles in the atom.

CHM 300 OBJECTIVES...2

UNIT 1: CHEMISTRY: MATTER, CHANGES AND ENERGY...CONTINUED

16. Give the atomic number and mass number of a specified isotope.

17. Write the number of protons, neutrons and electrons from the representation of a specified isotope.

18. Define atomic weight and describe how it differs from mass number.

19. Distinguish between atoms and molecules.

20. Describe the function of a covalent bond in a molecule.

21. List the elements and the number of atoms of that element in a compound from the formula.

22. Write definitions for the terms ion, cation, anion and electrostatic force.

23. Distinguish between molecular and ionic compounds.

24. List the number of protons, neutrons and electrons present in a specified atom or ion.

UNIT II:

Reference: Chapters 4 & 5 - Malone.

AFTER COMPLETION OF THESE CHAPTERS, THE STUDENT SHOULD BE ABLE TO:

1. Describe how to locate elements with similar chemical properties in the periodic table.

2. Give brief discussion of the origin of the periodic table and describe how it was first constructed.

3. Locate on the periodic table those elements existing as gases, liquids and solids.

4. Locate on the periodic table those elements that are metals, nonmetals and metalloids.

5. Explain what is meant by a period and a group.

6. Locate on the periodic table the elements in the first seven periods.

UNIT II: CONTINUED..

7. Give the characteristics of the electron configuration of the four general categories of elements.

8. Predict the general trend of the atomic radii of the representative elements.

UNIT III: CHEMICAL FORMULAS AND NOMENCLATURE OF INORGANIC COMPOUNDS

Ref: Chapters 7 & 8 - Malone.

AFTER COMPLETION OF THESE CHAPTERS, THE STUDENT SHOULD BE ABLE TO:

1. Determine the oxidation state of an element in a compound.

2. List the metals which have only one oxidation state.

3. Name metal-nonmetal binary compounds and write formulas given a name.

4. Apply the Stock method for naming compounds with metals that have variable oxidation states.

5. Write the names and formulas for the polyatomic ions listed in Table 7-3 (the charge must be correct).

6. Name metal-nonmetal binary compounds by use of Greek prefixes listed in Table 7-4.

7. Name binary oxyacids and write formulas given a name.

8. Describe the information represented by a balanced equation.

9. Write and balance simple equations.

10. Classify chemical reactions among the five types listed in the text.

UNIT IV: THE MOLE CONCEPT

Ref: Chapters 8 & 9 - Malone.

1. Describe the unit known as the mole and tell why it is needed in chemistry.

UNIT IV: THE MOLE CONCEPT...CONTINUED

2. Write the molar mass of any element from the periodic table.

3. Calculate the mass of the same number of atoms of one element given the mass of a different element.

4. Convert between moles, mass, and number of atoms of any element.

5. Calculate the formula mass of a specified compound.

6. Convert between moles, mass and number of molecules of formula units of a compound.

7. Calculate the percent composition of the elements in a compound.

8. Distinguish between an empirical and a molecular formula.

9. Calculate the empirical formula of a compound from its present composition or weight composition.

10. Use the data from chemical analysis to establish the molecular formula of a compound.

11. Use the balanced equation to obtain mole relationships among reactants and products.

12. Make the following stoichiometric conversions:
    a) Mole to mole
    b) Mole to weight (mass)
    c) Mass to mass

13. Calculate the percent yield from the actual yield and the theoretical yield.

14. Calculate the percent purity of a sample from the yield of a product.

UNIT IV: AQUEOUS SOLUTIONS

Ref: Chapter 12 - Malone.

15. Describe the conductivity properties and compositions of nonelectrolytes, strong electrolytes and weak electrolytes in water solution.

16. Write equations illustrating the solution of various ionic compounds in water.

UNIT IV: AQUEOUS SOLUTIONS...CONTINUED

17. Determine whether a specific ionic compound is soluble in water given a table of solubilities.

18. Solve problems involving percent composition of a solute.

19. Apply the definition of Molarity to solve the following types of problems:

    a) Preparation of a specified quantity and concentration of a solution.
    b) Calculation of the quantity of solute in a given quantity of solution.
    c) Dilution of a concentrated solution to make a specified dilute solution. Serial dilution using the formula

$$C_1V_1 = C_2V_2$$

20. Determine the Equivalent Weight of acids, bases, salts, and elements.

21. Calculate the amount of solute required to prepare solutions of varying normalities.

22. Convert normalities to molarities and vice versa.

23. Mix solutions of different concentrations and calculate the resulting concentrations.

UNIT V: ACID-BASE EQUILIBRIA

Ref: Chapter 13 - Malone.

1. Apply the Arrhenius definition to identify compounds as acids or bases and to write equations illustrating this behaviour.

2. Give the names and formulas of some common acids and bases derived from specified anions or cations.

3. Distinguish between behaviour of a strong and a weak acid in water.

4. Describe the dynamic equilibrium involved in the partial ionization of a weak acid or base in water.

5. Calculate $[OH^-]$ from a specified $[H_3O^+]$ and vice versa by use of K_w.

UNIT V: ACID-BASE EQUILIBRIA...CONTINUED

6. Distinguish between acidic, basic, or neutral solutions in terms of $[H_3O^+]$ and $[OH^-]$.

7. Convert $[H_3O^+]$ to pH and vice versa.

8. Distinguish between acidic, basic or neutral solutions in terms of pH.

9. Determine whether a specified solution acts as a buffer.

UNIT VI: ORGANIC CHEMISTRY AND BIOLOGICALLY SIGNIFICANT COMPOUNDS

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: WATERSHED MANAGEMENT

Code No.: FOR 318-4

Program: FISH AND WILDLIFE/PARKS & REACREATION TECHNOLOGY

Semester: V

Date: JUNE, 1985

Author: V. WALKER

New: _____ Revision: X

APPROVED: _____ _____
Chairperson Date

WATERSHED MANAGEMENT
FOR 318-4

WATERSHED MANAGEMENT	FOR 318-4
Course Name	Course Number

PHILOSOPHY/GOALS:

A practical course designed for field personnel to provide information on water management and minimizing erosion and sediment on land undergoing development or utilization.

METHOD OF ASSESSMENT (GRADING METHOD)

Unit Tests (3)	60%
Technical Reports (4)	40%
TOTAL	100%

TEXTBOOK(S): (Suggested)

Stream Enchancement Guide, 1980, Fisheries and Oceans and Ministry of the Environment, Province of British Columbia

Great Lakes Shore Processes and Shore Protection, 1981, Ontario Ministry of Natural Resources

WATERSHED MANAGEMENT
FOR 318-4

UNIT #1 - Physical Properties of Water Affecting Its Management
8 hrs.

- density changes with salt content and temperature
- significance and properties of ice, melting point
- viscosity, surface tension, capillary action
- specific heat, energy gains and losses
- seasonal temperature profile
- dimictic and meromictic lakes
- wind, waves and seiches
- river meanders and particle movement

UNIT #2 - Control of Runoff in Watersheds
6 hrs.

- water table maintenance through vegetation planting, proper land management practices
- the role of marshlands, beaver dams

Field Trip #1

- the role of small impoundments, reservoirs and farm ponds
- the construction of small impoundments and ponds
- the prediction and measurements of runoff
- channelization and its effects

UNIT TEST #1

UNIT #3 - Forestry Practices and Watershed Management
10 hrs.

- effect of logging on the aquatic environment
- Forest Practices and Streamflow (slide presentation)
- proper logging practices to minimize environmental damage
- importance of soils, slopes and vegetation types in resource development
- Logging and Water Quality (slide presentation)
- the construction of resource roads, location, stream crossing, sedimentary basins, culvert installation

Field Trip #2

UNIT #4 The Aquatic Community and its Habitat
8 hrs.

- invertebrates and their requirements for life
- fish and their needs
- simple water chemistry and its importance
- biological indicator species

WATERSHED MANAGEMENT
FOR 318-4

Field Trip #3

UNIT #5 - Stream Improvement Measures
12 hrs.

- streamside vegetation
- erosion and sediment control
- stream channel improvements
  - creating pools or runs
  - providing cover
  - rock revetments
  - spawning habitat
- stream flow control
- increasing food supply

UNIT TEST #2

UNIT #6 - Shore Processes and Shore Protection
12 hrs.

- shore features
- shore processes
- lake/land interaction
- Seabeaches - Their Formation & Erosion (slide presentation)
- shore protection
- design considerations for shore protection

FIELD TRIP #4

- legislation (M.N.R. Speaker)

UNIT #7 - Eutrophication and Environmental Pollutants
8 hrs.

- eutrophication: natural, cultural
- effects of eutrophication
- control
- pesticides in the environment (film)
- industrial pollutants (film)

WATERSHED MANAGEMENT
FOR 318-4

STUDENT EVALUATION

UNIT TESTS

A total of 3 unit tests based on lecture material will be written at the completion of units 2, 5, and 7. Each unit test will be worth a total of 20 marks.

Marks allotted for unit tests will be cumulative. A pass is 60%.

If a final grade of less than 60% is received based on both the lecture material and reports, and:

1. Only one unit test is failed, a test based on that unit failed will be written during the rewrite period.

2. Two or more unit tests are failed, a test based on the entire course material will be written during the rewrite period.

TECHNICAL REPORTS

A total of 4 technical reports will be handed in valued at 10 marks each. These reports will be based on the results of 4 separate field exercises.

FIELD TRIP #1: The Effect of a Beaver Dam in Natural Resource Conservation

FIELD TRIP #2: Forestry Practices & Watershed Management

FIELD TRIP #3: Habitat Comparison, West Davignon Creek

FIELD TRIP #4: Michigan Shore Processes & Protection

Technical reports are due 2 weeks after the respective field trip. A total o 10% will be deducted for every day late. Reports submitted after 1 week of d date will receive zero.

Field trips are compulsory. Students missing field trips without documented reason will receive an automatic zero on the corresponding technical reports.

EVALUATION SUMMARY

3 UNIT TESTS (lecture material)	20 X 3 = 60%
4 TECHNICAL REPORTS (based on field trips)	10 X 4 = 40%